
$\tau_L \stackrel{?}{=} \tau_{cc}$

1. $m_1 g l_1 + m_2 g l_2 + m_3 g l_3 \stackrel{?}{=} F_4 l_4 + F_5 l_5$ (sin θ)

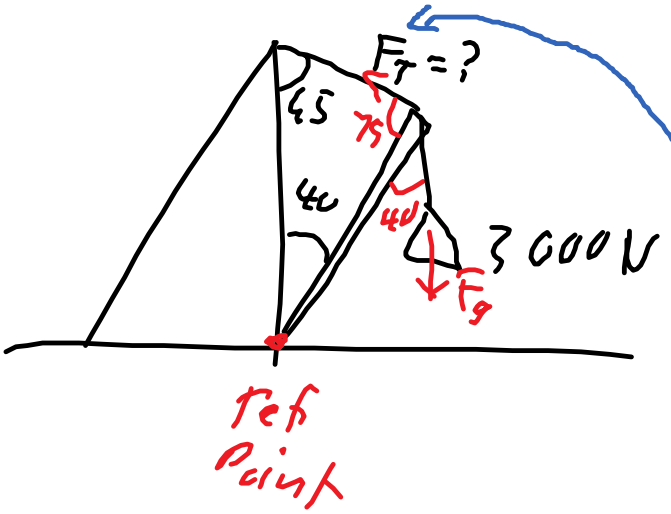
2. $-2s \quad m_2 g x_1 + F_1 x_2 \stackrel{?}{=} m_1 g x_3 + F_2 x_4$

Quiz next class on statics

Practice quiz:

a) 9800N b) $8.5 \times 10^3$N

2.




$\tau_L = \tau_{cc}$

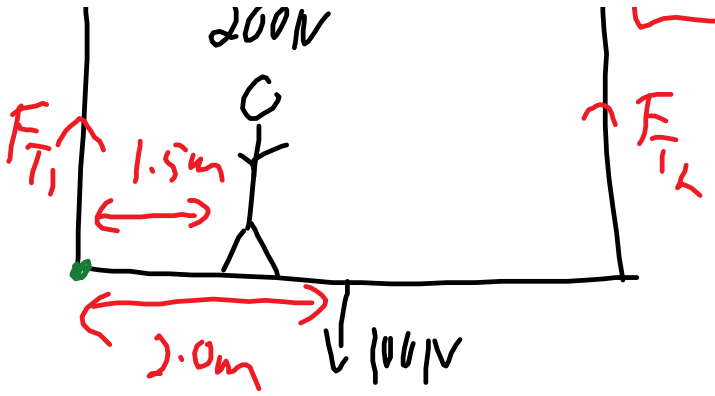
$F_g L \sin 40 = F_T L \sin 75$

$F_T = \dfrac{F_g \sin 40}{\sin 75}$

$F_T = 2.0 \times 10^3$ N

Q 3 | 200N

Q3



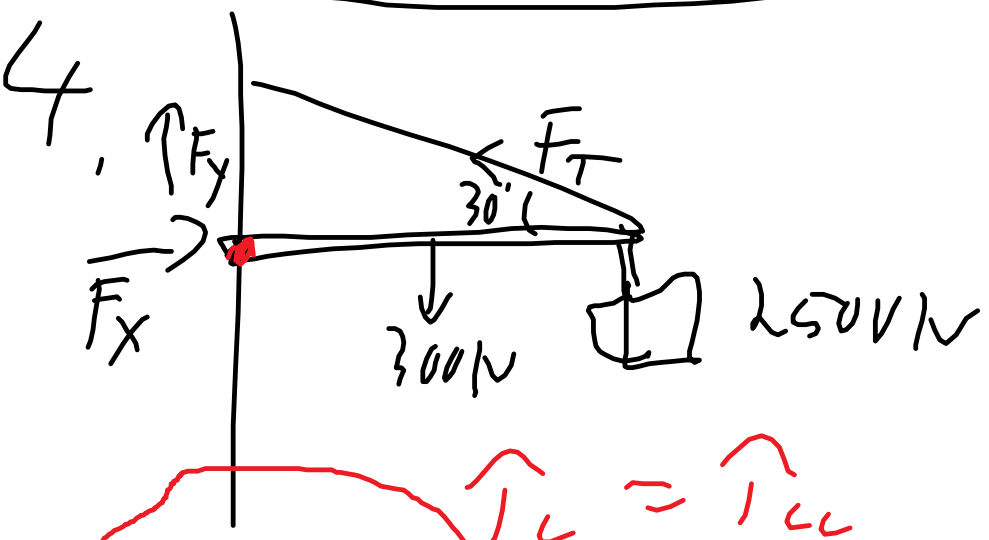

$$\curvearrowright_C = \curvearrowright_{C_2}$$

$$200N(1.5m) + 100N \times 2.0m = F_{T_2}(4m)$$

$$F_{T_2} = 125N$$

$$F_{T_1} = 175N$$

4.




$$\curvearrowright_C = \curvearrowright_{C_2}$$

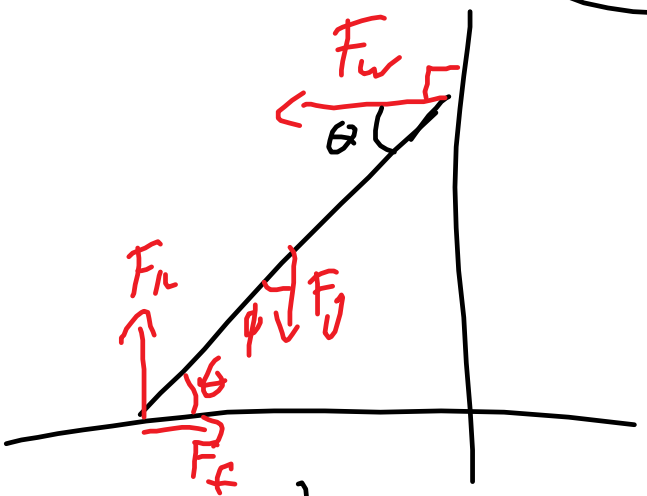
$$300N\left(\frac{3m}{2}\right) + 2500N(3m) = F_T(3m)\sin 30$$

a) $F_T = 5300N$

a) $T_T = 500\ N$

b) $T_T \cos\theta = 460\ N$

5.




$T_c = T_{cc}$

Asin(0.75)=48.59

* do b first, $\theta = \sin^{-1}\frac{3}{4} = 48.59$ ~~48.59~~

$F_g \frac{L}{2} \sin\phi = F_w L \sin\theta$

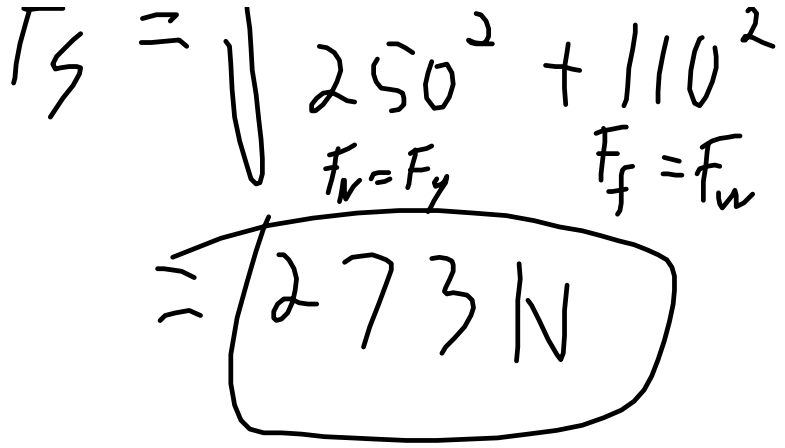
sinϕ

$$F_w = \frac{250\ N \cos 48.6}{2 \sin 48.6}$$

b) $F_w = 110\ N$

a) $F_{S_{static}} = \sqrt{F_N^2 + F_f^2}$

$F_S = \sqrt{250^2 + 110^2}$




Electrostatics Chapters 16 and 17

Rub a vinyl strip with rabbit fur and hear a crackling.
bring the vinyl strip near a pith ball (very light ball) and the ball is attracted, the ball touches the strip and then the ball is repelled. The ball then touches the metal stand and it is attracted to the strip again.

What's the deal?

There is a physical quantity called "charge", q or Q

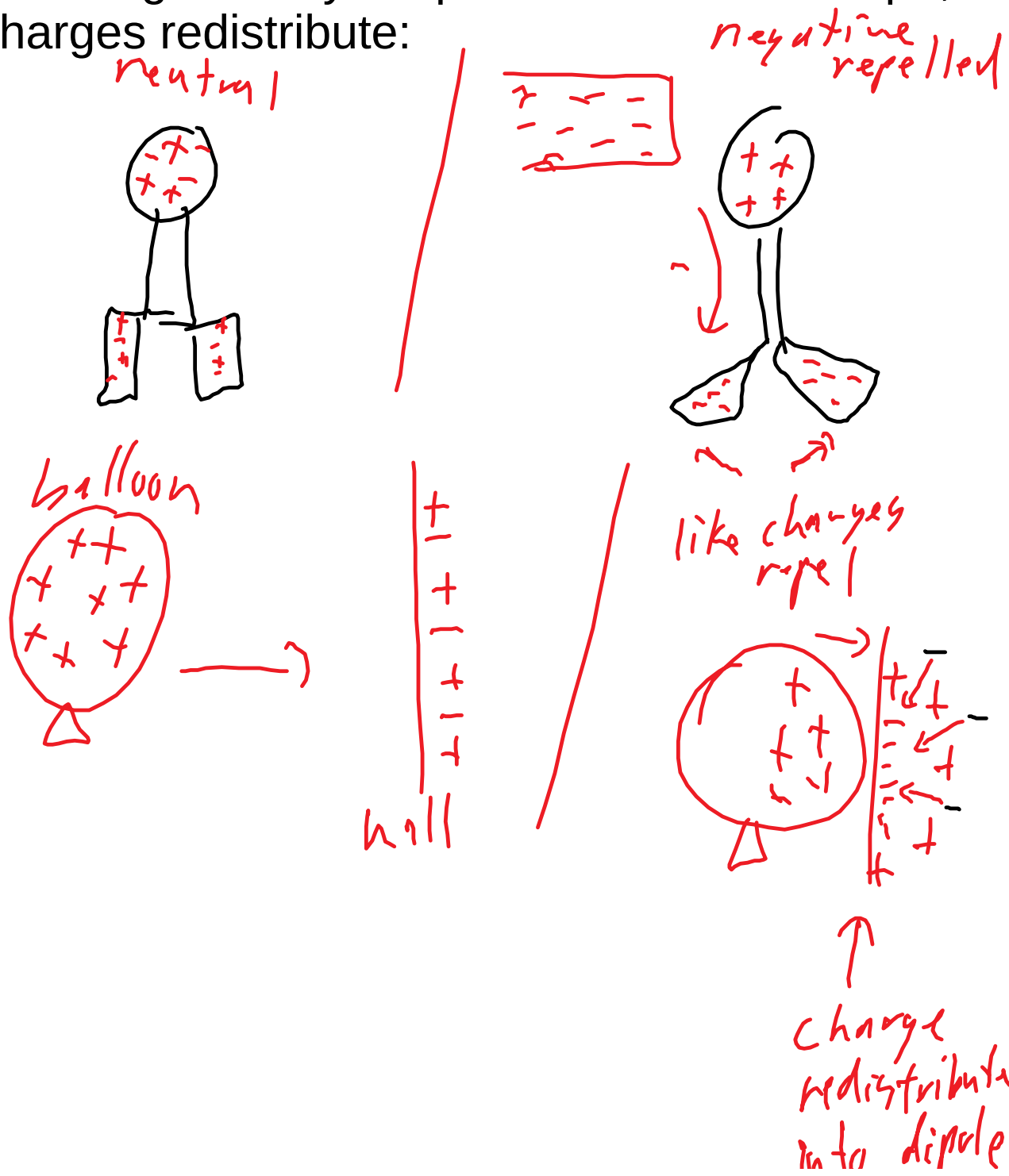
2 types: positive and negative
opposite charges attract
like charges repel

neutral charges - can be attracted to a charged object if the charges on the neutral object are free to move a bit - redistribute.

electroscope - light metal leaves that can move.

Benjamin Franklin - studied electrostatics
he decided that a glass rod would be positive when rubbed while a vinyl strip is negative. - arbitrary decision

When I bring the vinyl strip near the electroscope, the charges redistribute:



pos - neg.

There is a net attraction to the wall by the balloon because the opposite charge is closer, so we can deduce that electrostatic force is dependent on the distance between the charges.

Coulombs Law:

$F_e = kQq/r^2$

$F_e$ is the electrostatic force, in Newtons.
Q q is the charge, in Coulombs, C.
one electron or proton has a charge of
$e = 6.02 \times 10^{-19}C$
r is distance between the centre of the charges, in metres, m.
k is Coulomb's constant $9.00 \times 10^9\ Nm^2/C^2$

(note the parallels with gravity, $F_g=GMm/r^2$)

eg. An electron orbits a proton in a non-quantum Hydrogen atom. The radius of the atom is $5.0 \times 10^{-11}m$.

a) what is the electrostatic force between the electron and the proton?
b) if the mass of an electron is $9.11 \times 10^{-31}kg$, what is the acceleration of the electron?
c) if it is in uniform circular motion, what is the velocity and period of revolution of the

electron?